

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): An information processing apparatus for recording AV streams onto a recording medium comprising:

encoding means for generating each of said AV streams forming a plurality of reproduction paths;

managing information generating means for generating managing information including map information indicating positions of entry points of each of said AV streams and reproduction managing information indicating reproduction path change points set on the basis of said entry points included in said map information; and

recording means for recording said AV streams and said managing information onto said recording medium.

Claim 2 (Original): An information processing apparatus as claimed in claim 1, wherein said managing information generating means generates a correspondence table describing correspondences between packet numbers and presentation time stamps of said entry points as said map information.

Claim 3 (Original): An information processing apparatus as claimed in claim 2, wherein:

said encoding means generates the AV streams one for each of said reproduction paths; and

said managing information generating means generates said map information and said reproduction managing information regarding all the AV streams generated one for each of said reproduction paths as one correspondence table.

Claim4 (Original): An information processing apparatus as claimed in claim 2, wherein said managing information generating means generates said map information and said reproduction managing information regarding the AV streams generated one for each of said reproduction paths separately for each of said reproduction paths.

Claim 5 (Original): An information processing apparatus as claimed in claim 4, wherein said managing information generated by said managing information generating means includes information for specifying each of the AV streams generated one for each of the reproduction paths and information for specifying a section where a plurality of said reproduction paths are present.

Claim 6 (Original): An information processing apparatus as claimed in claim 2, wherein:

said encoding means performs encoding such that a video stream of each section starting at said reproduction path change point is a Closed GOP starting with an I-picture and a first packet is a video packet; and

said AV streams generated by said encoding means are included in a transport stream.

Claim7 (Original): An information processing apparatus as claimed in claim 6, wherein said encoding means sets an identical value as a video packet ID of the transport stream and an identical value as an audio packet ID of the transport stream in all the reproduction paths.

Claim 8 (Original): An information processing apparatus as claimed in claim 4, further comprising source-packetizing means for source-packetizing said transport stream of each section,

wherein said recording means records said transport stream of each section source-packetized by said source-packetizing means as an AV stream file onto said recording medium.

Claim 9 (Original): An information processing apparatus as claimed in claim 2, wherein, when recording said AV streams on said recording medium, said recording means records said AV streams after interleaving said AV streams such that said sections of the reproduction paths are in predetermined order.

Claim 10 (Original): An information processing apparatus as claimed in claim 2, wherein, when recording said AV streams on said recording medium, said recording means records said AV streams such that a plurality of said sections of an identical reproduction path are continuous with each other.

Claim 11 (Original): An information processing apparatus as claimed in claim 2, wherein said reproduction managing information includes change information indicating whether or not reproduction paths can be changed at said entry points.

Claim 12 (Original): An information processing method of an information processing apparatus for recording AV streams onto a recording medium, said information processing method comprising:

an encoding step for generating each of said AV streams forming a plurality of reproduction paths;

a managing information generating step for generating managing information including map information indicating positions of entry points of each of said AV streams and reproduction managing information indicating reproduction path change points set on the basis of said entry points included in said map information; and

a recording step for recording said AV streams and said managing information onto said recording medium.

Claim 13 (Original): A program storing medium on which a computer readable program for recording AV streams onto a recording medium is recorded, said program comprising:

an encoding step for generating each of said AV streams forming a plurality of reproduction paths;

a managing information generating step for generating managing information including map information indicating positions of entry points of each of said AV streams and reproduction managing information indicating reproduction path change points set on the basis of said entry points included in said map information; and

a recording step for recording said AV streams and said managing information onto said recording medium.

Claim 14 (Original): A program for recording AV streams onto a recording medium, said program making a computer perform:

an encoding step for generating each of said AV streams forming a plurality of reproduction paths;

a managing information generating step for generating managing information including map information indicating positions of entry points of each of said AV streams and reproduction managing information indicating reproduction path change points set on the basis of said entry points included in said map information; and

a recording step for recording said AV streams and said managing information onto said recording medium.

Claim 15 (Original): An information processing apparatus for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said information processing apparatus comprising:

reading means for reading said reproduction managing information given to each reproduction path having each section divided by a reproduction path change point of said AV stream as a unit, and reading said map information including a correspondence table describing a correspondence between a packet number and a presentation time stamp of said change point of said AV stream;

reproducing means for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by said reading means;

retrieving means for, when an instruction to make a reproduction path change is given, retrieving said reproduction managing information of a reproduction path from which to make the reproduction path change and said reproduction managing information of a reproduction path to which to make the reproduction path change;

first obtaining means for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said

reproduction managing information of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

second obtaining means for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

control means for controlling said reproducing means to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 16 (Original): An information processing method of an information processing apparatus for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said information processing method comprising:

a reading step for reading said reproduction managing information given to each reproduction path having each section divided by a reproduction path change point of said AV stream as a unit, and reading said map information including a correspondence table describing a correspondence between a packet number and a presentation time stamp of said change point of said AV stream;

a reproducing step for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by processing of said reading step;

a retrieving step for, when an instruction to make a reproduction path change is given, retrieving said reproduction managing information of a reproduction path from which to make the reproduction path change and said reproduction managing information of a reproduction path to which to make the reproduction path change;

a first obtaining step for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining step for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a control step for controlling processing of said reproducing step to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 17 (Original): A program storing medium on which a computer readable program is recorded, said program reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said program comprising:

a reading step for reading said reproduction managing information given to each reproduction path having each section divided by a reproduction path change point of said AV stream as a unit, and reading said map information including a correspondence table

describing a correspondence between a packet number and a presentation time stamp of said change point of said AV stream;

a reproducing step for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by processing of said reading step;

a retrieving step for, when an instruction to make a reproduction path change is given, retrieving said reproduction managing information of a reproduction path from which to make the reproduction path change and said reproduction managing information of a reproduction path to which to make the reproduction path change;

a first obtaining step for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining step for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a control step for controlling processing of said reproducing step to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 18 (Original): A program for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV



streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said program making a computer perform:

a reading step for reading said reproduction managing information given to each reproduction path having each section divided by a reproduction path change point of said AV stream as a unit, and reading said map information including a correspondence table describing a correspondence between a packet number and a presentation time stamp of said change point of said AV stream;

a reproducing step for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by processing of said reading step;

a retrieving step for, when an instruction to make a reproduction path change is given, retrieving said reproduction managing information of a reproduction path from which to make the reproduction path change and said reproduction managing information of a reproduction path to which to make the reproduction path change;

a first obtaining step for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining step for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said reproduction managing information of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a control step for controlling processing of said reproducing step to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 19 (Original): An information processing apparatus for recording AV streams onto a recording medium comprising:

encoding means for generating each of said AV streams forming a plurality of reproduction paths;

managing information generating means for generating managing information including map information indicating a start point of said AV stream of each reproduction path and positions of entry points of said AV stream, and reproduction managing information including the start point and an end point of said AV stream, reproduction path change points included in said entry points included in said map information, and specifying information for specifying the AV stream of each reproduction path; and

recording means for recording said AV streams and said managing information onto said recording medium.

Claim 20 (Original): An information processing apparatus as claimed in claim 19, wherein said managing information generating means generates a correspondence table describing correspondences between packet numbers and presentation time stamps of said entry points as said map information.

Claim 21 (Original): An information processing apparatus as claimed in claim 20, wherein:

said encoding means generates the AV streams one for each of said reproduction paths; and

said managing information generating means generates said map information and said reproduction managing information regarding all the AV streams generated one for each of said reproduction paths as one correspondence table.

Claim 22 (Original): An information processing apparatus as claimed in claim 20, wherein said managing information generating means generates said map information and said reproduction managing information regarding the AV streams generated one for each of said reproduction paths separately for each of said reproduction paths.

Claim 23 (Original): An information processing apparatus as claimed in claim 22, wherein said managing information generated by said managing information generating means includes information for specifying each of the AV streams generated one for each of the reproduction paths and information for specifying a section where a plurality of said reproduction paths are present.

Claim 24 (Original): An information processing apparatus as claimed in claim 20, wherein:

said encoding means performs encoding such that a video stream of each section starting at said reproduction path change point is a Closed GOP starting with an I-picture and a first packet is a video packet; and

said AV streams generated by said encoding means are included in a transport stream.

Claim 25 (Original): An information processing apparatus as claimed in claim 24, wherein said encoding means performs encoding such that a start of the video stream of each

section is said Closed GOP and a subsequent part of the video stream of each section is a non-Closed GOP.

Claim 26 (Original): An information processing apparatus as claimed in claim 22, further comprising source-packetizing means for source-packetizing said transport stream of each section,

wherein said recording means records said transport stream of each section source-packetized by said source-packetizing means as an AV stream file onto said recording medium.

Claim 27 (Original): An information processing apparatus as claimed in claim 26, wherein said managing information generating means generates one said correspondence table to be included in said map information, said correspondence table corresponding to said AV stream file.

Claim 28 (Original): An information processing apparatus as claimed in claim 20, wherein, when recording said AV streams on said recording medium, said recording means records said AV streams after interleaving said AV streams such that said sections of the reproduction paths are in predetermined order.

Claim 29 (Original): An information processing apparatus as claimed in claim 20, wherein, when recording said AV streams on said recording medium, said recording means records said AV streams such that a plurality of said sections of an identical reproduction path are continuous with each other.

Claim 30 (Original): An information processing apparatus as claimed in claim 19, wherein said reproduction managing information includes change information indicating whether or not reproduction paths can be changed at said entry points.

Claim 31 (Original): An information processing method of an information processing apparatus for recording AV streams onto a recording medium, said information processing method comprising:

- an encoding step for generating each of said AV streams forming a plurality of reproduction paths;

- a managing information generating step for generating managing information including map information indicating a start point of said AV stream of each reproduction path and positions of entry points of said AV stream, and reproduction managing information including the start point and an end point of said AV stream, reproduction path change points included in said entry points included in said map information, and specifying information for specifying the AV stream of each reproduction path; and

- a recording step for recording said AV streams and said managing information onto said recording medium.

Claim 32 (Original): A program storing medium on which a computer readable program of an information processing apparatus for recording AV streams onto a recording medium is recorded, said program comprising:

- an encoding step for generating each of said AV streams forming a plurality of reproduction paths;

- a managing information generating step for generating managing information including map information indicating a start point of said AV stream of each reproduction

path and positions of entry points of said AV stream, and reproduction managing information including the start point and an end point of said AV stream, reproduction path change points included in said entry points included in said map information, and specifying information for specifying the AV stream of each reproduction path; and

a recording step for recording said AV streams and said managing information onto said recording medium.

Claim 33 (Original): A program of an information processing apparatus for recording AV streams onto a recording medium, said program making a computer perform:

an encoding step for generating each of said AV streams forming a plurality of reproduction paths;

a managing information generating step for generating managing information including map information indicating a start point of said AV stream of each reproduction path and positions of entry points of said AV stream, and reproduction managing information including the start point and an end point of said AV stream, reproduction path change points included in said entry points included in said map information, and specifying information for specifying the AV stream of each reproduction path; and

a recording step for recording said AV streams and said managing information onto said recording medium.

Claim 34 (Original): An information processing apparatus for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said information processing apparatus comprising:

reading means for reading said reproduction managing information including a reproduction path change point of said AV streams, a start point and an end point of said AV streams, and specifying information for specifying the AV stream of each reproduction path, and reading said map information including a correspondence table describing correspondences between packet numbers and presentation time stamps of said start point and said change point of said AV streams;

reproducing means for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by said reading means;

retrieving means for, when an instruction to make a reproduction path change is given, retrieving said section of a reproduction path from which to make the reproduction path change and said section of a reproduction path to which to make the reproduction path change;

first obtaining means for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said section of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

second obtaining means for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said section of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

control means for controlling said reproducing means to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 35 (Original): An information processing method of an information processing apparatus for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said information processing method comprising:

a reading step for reading said reproduction managing information including a reproduction path change point of said AV streams, a start point and an end point of said AV streams, and specifying information for specifying the AV stream of each reproduction path, and reading said map information including a correspondence table describing correspondences between packet numbers and presentation time stamps of said start point and said change point of said AV streams;

a reproducing step for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by processing of said reading step;

a retrieving step for, when an instruction to make a reproduction path change is given, retrieving said section of a reproduction path from which to make the reproduction path change and said section of a reproduction path to which to make the reproduction path change;

a first obtaining step for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said section of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining step for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said



section of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a control step for controlling processing of said reproducing step to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 36 (Original): A program storing medium on which a computer readable program is recorded, said program reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said program comprising:

a reading step for reading said reproduction managing information including a reproduction path change point of said AV streams, a start point and an end point of said AV streams, and specifying information for specifying the AV stream of each reproduction path, and reading said map information including a correspondence table describing correspondences between packet numbers and presentation time stamps of said start point and said change point of said AV streams;

a reproducing step for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by processing of said reading step;

a retrieving step for, when an instruction to make a reproduction path change is given, retrieving said section of a reproduction path from which to make the reproduction path change and said section of a reproduction path to which to make the reproduction path change;

a first obtaining step for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said section of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining step for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said section of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a control step for controlling processing of said reproducing step to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 37 (Original): A program for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said program making a computer perform:

a reading step for reading said reproduction managing information including a reproduction path change point of said AV streams, a start point and an end point of said AV streams, and specifying information for specifying the AV stream of each reproduction path, and reading said map information including a correspondence table describing correspondences between packet numbers and presentation time stamps of said start point and said change point of said AV streams;

a reproducing step for reproducing said AV streams recorded on said recording medium on the basis of said reproduction managing information read by processing of said reading step;

a retrieving step for, when an instruction to make a reproduction path change is given, retrieving said section of a reproduction path from which to make the reproduction path change and said section of a reproduction path to which to make the reproduction path change;

a first obtaining step for obtaining a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change on the basis of said section of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining step for obtaining a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change on the basis of said section of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a control step for controlling processing of said reproducing step to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 38 (Original): A computer readable recording medium on which AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable,

wherein data is recorded having a structure such that:

said reproduction managing information includes information on a reproduction path change point of said AV streams and a start point and an end point of said AV streams; and

said map information includes a correspondence table describing correspondences between packet numbers and presentation time stamps of said start point and said change point of said AV streams.

Claim 39 (Original): A computer readable recording medium on which AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable,

wherein data is recorded having a structure such that:

said reproduction managing information includes a reproduction path change point of said AV streams, a start point and an end point of said AV streams, and specifying information for specifying the AV stream of each reproduction path; and

said map information includes a correspondence table describing correspondences between packet numbers and presentation time stamps of said start point and said change point of said AV streams.

Claim 40 (New): An information processing apparatus for recording AV streams onto a recording medium comprising:

an encoder configured to generate each of said AV streams forming a plurality of reproduction paths;

a managing information generator configured to generate managing information including map information indicating positions of entry points of each of said AV streams and reproduction managing information indicating reproduction path change points set based on said entry points included in said map information; and

a recording unit configured to record said AV streams and said managing information onto said recording medium.

Claim 41 (New): An information processing apparatus for reproducing AV streams from a recording medium on which said AV streams, map information for managing an entity of said AV streams, and reproduction managing information for managing reproduction of said AV streams are recordable, said information processing apparatus comprising:

a reading unit configured to read said reproduction managing information given to each reproduction path having each section divided by a reproduction path change point of said AV stream as a unit, and reading said map information including a correspondence table describing a correspondence between a packet number and a presentation time stamp of said change point of said AV stream;

a reproducing part configured to reproduce said AV streams recorded on said recording medium based on said reproduction managing information read by said reading unit;

a retrieving part configured to, when an instruction to make a reproduction path change is given, retrieve said reproduction managing information of a reproduction path from which to make the reproduction path change and said reproduction managing information of a reproduction path to which to make the reproduction path change;

a first obtaining part configured to obtain a reproduction end position of said AV stream of the reproduction path from which to make the reproduction path change based on said reproduction managing information of the reproduction path from which to make the reproduction path change and said correspondence table of the reproduction path from which to make the reproduction path change;

a second obtaining part configured to obtain a reproduction start position of said AV stream of the reproduction path to which to make the reproduction path change based on said reproduction managing information of the reproduction path to which to make the reproduction path change and said correspondence table of the reproduction path to which to make the reproduction path change; and

a controller configured to control said reproducing unit to move a reproducing point at said reproduction end position to said reproduction start position.

Claim 42 (New): An information processing apparatus for recording AV streams onto a recording medium comprising:

an encoder configured to generate each of said AV streams forming a plurality of reproduction paths;

a managing information generator configured to generate managing information including map information indicating a start point of said AV stream of each reproduction path and positions of entry points of said AV stream, and reproduction managing information including the start point and an end point of said AV stream, reproduction path change points included in said entry points included in said map information, and specifying information for specifying the AV stream of each reproduction path; and

a recording unit configured to record said AV streams and said managing information onto said recording medium.